

National Standards for the Mapping and Classification of Wetlands: Implementation and Maintenance



The Federal Geographic Data Committee adopted national standards for classifying wetlands in 1996, but added national standards for mapping wetlands in 2009. This update addresses the implementation of these standards, the maintenance review of the classification standard, and how wetlands scientists can participate and provide input.

By JANE AWL, BILL WILEN, REBECCA ALLEE, LARRY HANDLEY, MARGARETE HEBER, PAMELA BLASEDELL, JOHN GALBRAITH, AND MEGAN LANG

The Federal Geographic Data Committee's (FGDC's) National Standards for Wetlands Mapping and Classification specify the minimum quality of data necessary to allow inclusion of the data into the National Spatial Data Infrastructure (NSDI). A new FGDC standard for mapping wetlands was approved in July 2009 (see *National Wetlands Newsletter* Sept.-Oct. 2009). A dynamic implementation plan for the standard was subsequently released in January 2010. In February 2010, a proposal to begin a maintenance review of the existing FGDC Classification Standard for Wetlands was accepted by the FGDC Standards Committee.

The *Implementation Plan for the FGDC Wetlands Mapping Standard* is the first such implementation plan ever developed for an FGDC standard. The *Implementation Plan* was developed as a dynamic document to be updated by the Wetlands Subcommittee of the FGDC as needed, and is published online at www.fws.gov/wetlands/_documents/gNSDI/DRAFTImplementationPlanFGDCWetlandsMappingStandard.pdf. Key issues addressed in the *Implementation Plan* include:

- Developing a forum to address ongoing technical challenges using existing partnerships;
- Accelerating availability of data to update the National Wetlands Inventory (NWI);
- Outreach and training related to standard requirements;
- Building funding coalitions and identifying grant opportunities;
- Providing a framework to prioritize wetland mapping needs based on decisionmaking requirements.

Once groups have identified funding, it is important that contracts and project descriptions contain language that support the standard, such as the following:

A National Wetlands Mapping Standard has recently been developed by a working group of the Federal Geographic Data Committee (FGDC). This work has provided a national standard for wetland mapping, which must be used in all mapping projects that are funded

Jane Awl is an environmental biologist with the Association of State Wetland Managers and secretary of the Wetland Mapping Consortium (WMC). Bill Wilen is the chair of the Wetlands Subcommittee of the Federal Geographic Data Committee (FGDC), and serves with the U.S. Fish and Wildlife Service's National Wetlands Inventory. Rebecca Allee serves as a senior scientist for the National Oceanic and Atmospheric Administration's (NOAA's) Gulf Coast Services Center and is the NOAA project lead for the development of the Coastal and Marine Ecological Classification Standard. Larry Handley is a geographer with the U.S. Geological Survey Mid-Continent Geographic Science Center. Margarete Heber is the chair of the FGDC Wetlands Mapping Standard Working Group, currently on detail to the U.S. Environmental Protection Agency Office of Water's Management and Operations staff as the information management officer and QA officer. Pamela Blasedell is a geographer with INDUS Corp., working under contract with EPA Office of Water. John Galbraith is a co-developer and host of the WMC Scholar website and is an associate professor of crop and soil environmental sciences at Virginia Tech. Megan Lang is the chair of the WMC and a research ecologist with the U.S. Forest Service Forest Inventory and Analysis Program.

through the federal government, so that they can be uploaded to the national database to refine the existing wetlands data. Non-federally funded wetland mapping projects are encouraged to comply with the standard. The National Wetland Mapping Standard can be found at: www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping/index.html.

The official scope of the FGDC Wetlands Mapping Standard is posted on the FGDC website at www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping, and reads:

The mapping standard will be used for all wetland mapping nationally, including federal agencies, states, and tribes, and especially if that mapping data will be uploaded into the National Wetlands Inventory's (NWI's) national map as a data layer. Specifically, if federal funding is involved, then use of the standard is required. For all other efforts, use of the standard is strongly encouraged.

The Wetlands Mapping Standard document itself also states that “[f]or activities which include wetlands inventory mapping as a subset, any new, updated or revised wetland mapping shall conform to this standard.” To avoid confusion over whether the standard applies to all federal programs providing funds for mapping wetlands, within the standard, the phrase “wetlands inventory mapping” is clearly defined to mean the mapping of wetlands in a broader sense than just the NWI program. In the Definitions section in Appendix C, it reads: “wetlands inventory mapping—more detailed mapping and classification of wetlands beyond distinguishing wetland from non-wetland or between simple categories of forested and non-forested or vegetated and non-vegetated.”

The role of the ASWM in implementing the National Wetlands Mapping Standard is specified in the *Implementation Plan*:

- provide on-going support for implementing new technologies used in wetland mapping, such as data collection procedures;
- foster coalitions that may purchase imagery;
- post maps of imagery status;
- publish case studies of applications that use the wetlands data;
- help develop and provide a gateway to training opportunities; and
- assist in the development of online and instructor-lead training programs.

The Wetland Mapping Consortium (WMC), formed in partnership with the ASWM and Virginia Tech University, is assisting in the implementation of FGDC wetlands standards through the development of online discussion groups and other web resources and communication tools for technical issues related to wetlands mapping and remote sensing. See www.aswm.org/swp/mapping for more information.

DO THESE STANDARDS APPLY TO WETLAND JURISDICTIONAL BOUNDARIES? No.

The FGDC Wetlands Standards use a broad science-based feature definition for wetlands, as opposed to relying on potentially changeable jurisdictional or regulatory definitions. FGDC National Wetlands Standards use the wetland definition and feature a classification system from Classification of Wetlands and Deepwater Habitats (www.fws.gov/wetlands/_documents/gNSDI/ClassificationWetlandsDeepwaterHabitatsUS.pdf).

As such, these wetlands standards do NOT apply to site-specific mapping of jurisdictional wetland boundaries. Using a feature definition based on biological and remote-sensing criteria for national-scale mapping avoids regulatory and political changes over time, resulting in more durable mapping products and geographic analyses.

ROLE OF THE FGDC NATIONAL STANDARDS FOR WETLANDS MAPPING AND CLASSIFICATION:

- Improve wetlands data availability and quality through sharing and re-use;
- Streamline mapping efforts and data-sharing for greater efficiency and reduced costs;
- Drive consistent mapping and classification of features across geopolitical and watershed boundaries to create a seamless layer;
- Provide alignment and coordination with other pertinent standards, such as the National Hydrography Dataset and the Coastal and Marine Ecological Classification Standard;
- Enable any entity to submit compliant wetlands mapping data and updates to the National Wetlands Inventory Geodatabase and the USGS National Map;
- Allow long-term use of data by utilizing a broad science-based definition of wetlands for mapping, where features are not dependent on potentially variable legal or programmatic jurisdiction;
- Set the bar for minimum requirements for data compatibility; and
- Encourage technological improvements over time by allowing users to exceed the minimum requirements as desired, and updating the standards on a five-year cycle.

DO THE STANDARDS LIMIT THE AMOUNT OF DETAIL THAT CAN BE SHOWN ON THE MAPS? No.

The FGDC Wetlands Standards are NOT intended to restrict mapping detail or resolution. The Standards may be exceeded if greater detail is desired and funding is available. Nothing in the standard prevents the use of additional source data or methods to improve wetland mapping (such as soil data, Digital Elevation Models, LiDAR, radar, etc.)—such ancillary/collateral sources are expected to become even more important as technology progresses.

CAN THE WETLAND MAPPING CONSORTIUM HELP YOUR PROJECT MOVE FORWARD?

Other working groups, academic researchers, students, and wetland professionals who are involved in the mapping of wetlands and related resources may join the WMC and utilize our communication tools and resources to foster collaboration. Individual project resource areas and member lists, such as for regional, state, tribal, and local working groups, can be set up within the WMC. Please see more information about contacting us and joining the WMC on the ASWM mapping web page at:

www.aswm.org/swp/mapping.

The WMC is an interdisciplinary group of wetland scientists and managers interested in mapping and monitoring wetlands with remotely sensed images and using the resultant products to best manage wetland resources. Their goal is to improve the management of wetland resources through enhanced wetland mapping, monitoring, and dissemination of this information.

The WMC receives additional assistance from Virginia Tech's Scholar website, at <https://scholar.vt.edu/portal>. Scholar is based on the Sakai Project open-source suite of learning, portfolio library, and project tools. Sakai is distributed as free and open-source software under the Educational Community License <http://sakaiproject.org/>. Projects on Virginia Tech's Scholar website are designed to facilitate collaboration. Project leaders can invite members to join their project site. Using a web browser, project leaders can customize their site by choosing from features and functions to tailor the project sites to meet the specific needs of the group. Group members can make announcements and share resources, such as electronic documents or links to other websites, and collaborate with other colleagues. A group can electronically work on documents or materials collaboratively. Communication

tools also include a calendar of events, chat rooms, polls, discussion forums, blogs, and podcasts.

A role for the WMC is specified in the *Implementation Plan*:

- fostering collaboration;
- providing ongoing support for implementing new technologies;
- adding discussion group capabilities to address technical challenges; and
- developing new applications to meet the needs of decisionmakers.

The process of developing the Wetlands Mapping Standard also lead to specific recommendations for corresponding updates to the FGDC Wetlands Classification Standard on which it relies. FGDC Standards are reviewed and updated on five-year cycles (FGDC Directive #9, Maintenance and Support, directs the maintenance authority of an endorsed standard to evaluate the standard at least every five years). In February 2010, a proposal to begin a maintenance review of the existing FGDC Classification Standard for Wetlands was accepted by the FGDC Standards Committee. The maintenance review of the Classification Standard will consider recommendations provided by the working group that developed the Mapping Standard. In addition, the standard will be reformatted to be consistent with current FGDC protocols, while reference citations and example images will be updated as well. A revised draft of the Classification Standard is anticipated to be submitted for public comments in 2011. See more information online at www.fgdc.gov/standards/projects/FGDC-standards-projects/maintenance-review-wetlands-classification-std.

The approved maintenance review of the Classification Standard is intentionally limited in scope. In particular, there will be no changes to the definition of wetlands or regulatory jurisdiction. There will not be any changes in the hierarchical structure of the classification system, nor changes to the top three levels of the hierarchy including system, subsystem, and class. This means that there will not be any changes in the categories of wetlands that have been used to produce the four U.S. Fish and Wildlife (FWS) reports to the U.S. Congress on the Status and Trends of Wetlands in the Conterminous United States. This continuity will also maintain wetland categories that have been monitored for over 60 years, now within the EPA's National Wetland Condition Assessment. The maintenance review objectives for the Classification Standard include:

- Revising the Classification Standard to produce a newly edited and updated version;
- Formatting the document to be consistent with recently endorsed standards;
- Reflecting advances in the science; and
- Incorporating recommendations endorsed as part of the mapping standard development and supported by

the NWT's *Data Collection Requirements and Procedures for Mapping Wetland, Deepwater, and Related Habitats of the United States*.

During this period of maintenance, the Wetlands Classification Standard will be reviewed for consistency with the Coastal and Marine Ecological Classification Standard (CMECS). The CMECS is currently under consideration for endorsement by the FGDC as the national standard for classifying coastal and marine habitats. The CMECS was structured to parallel and extend the Wetlands Classification Standard from the coastal boundary out through deep ocean waters. If a determination is made that inconsistencies exist, the developers of the CMECS and the Wetlands Classification Standard Maintenance Working Group will discuss resolutions, either by revisions to the Wetlands Classification Standard or the CMECS.

A review of the hundreds of references, citations, and resources in the existing Wetlands Classification Standard is beginning. All of these references are over 30 years old now, so updates are critically needed to accurately represent the current state of the science. Input from wetland scientists, academic researchers and students, government personnel, geographers, environmentalists, nongovernmental organizations, and other interested parties is requested. Please see more information on how to participate in the review of the references, citations, and example photos in the existing Classification Standard on the ASWM Wetland Mapping webpage, at www.aswm.org/swp/mapping.

A new Wetlands Classification Imagery Gallery has been developed to assist in the compilation of more recent example photos and other imagery for updating the Classification Standard. The gallery provides a visual framework for the classification of the various and multitude of possible wetland habitat types. The role of the gallery is to support an updated and more robust version of the example image collection critical to the widespread use of the Classification Standard. The gallery has been designed to facilitate submission and retrieval of documented images and associated information to support future wetland classification efforts. The gallery was developed by CNL World with input from the U.S. Environmental Protection Agency, the FWS, U.S. Geological Survey, the ASWM and the WMC. CNL World is a nonprofit established in 2009 to develop resources for wetlands education. The developers of the Wetlands Classification Imagery Gallery hope to take advantage of the power of readily available geo-coding applications now incorporated into mobile phone technology, web applications, etc., to harness the power of the wetlands stakeholder community to provide current, geo-coded imagery. In addition to images, participants may submit information, such as the dominant and scientific plant names, wetland category, NWI classification code (if known), and location information. Easy-to-use templates are available to facilitate field use and image submission. Submissions will be reviewed by wetland experts, who will confirm the classification codes. Wetland scientists, academic researchers and students, government personnel, geographers, environmentalists, nongovernmental organizations, and other interested parties are all invited to contribute to the Wetlands Classification Image Gallery. Please see more information online at www.wetlandgallery.cnlworld.org. ■

WHAT ARE THE CURRENTLY ENDORSED FGDC NATIONAL STANDARDS FOR WETLANDS?

- Classification Standard (*Classification of Wetlands and Deepwater Habitats of the United States*) endorsed by the FGDC in 1996, available at www.fws.gov/wetlands/_documents/gNSDI/ClassificationWetlandsDeepwaterHabitatsUS.pdf. See further information on the FGDC website, at www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands/fgdc-announce.
- Mapping Standard endorsed by the FGDC in 2009, available at www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping/2009-08%20FGDC%20Wetlands%20Mapping%20Standard_final.pdf.

WHAT TECHNICAL GUIDANCE IS AVAILABLE?

Data Collection Requirements and Procedures for Mapping Wetland, Deepwater and Related Habitats of the United States published in 2009, available at: www.fws.gov/wetlands/_documents/gNSDI/DataCollectionRequirementsProcedures.pdf.

MINIMUM REQUIREMENTS FOR WETLANDS MAPPING COVER THE FOLLOWING DATA-QUALITY COMPONENTS:

Source Imagery; Base Imagery; Classification Accuracy; Data Verification; Logical Consistency; Edge Matching; Attribute Validity; Datum and Projection; Metadata; FWS Coordination; and Quality Control

NEW MINIMUM REQUIREMENTS FOR MAPPING WETLANDS IN THE LOWER 48 STATES AND HAWAII INCLUDE:

- Target mapping unit of 0.5 acre (instead of 1 acre);
- Resolution of 1 meter (instead of 3 meters);
- Recommended data refresh rate of every 5 years (instead of every 20 years); and
- Waiver process for specific minimum requirements (so that the best available data can be provided online).